Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

THE

AMERICAN NATURALIST.

VOL. XX.—*APRIL*, 1886.—NO. 4.

THE ANCESTRY OF NASUA.[1]

BY SAMUEL LOCKWOOD, PH.D.

AFTER a chronicle of such achievements of Coati-Mondi and her Cousin "Coon," shall we not institute a serious search into the origin of the heroine, and so establish or set aside our suspicion? "So I should think," says an interested reader, "after such a tidbit of revelry in the romance of science-dom or dream-land." So, ho! a challenge to the array! Then let the contest come! But pray, good sir, is there not in this realm of science an imagination which conducts to light and truth, as against that romance which leads surely to error and darkness? But what is scientific romancing? Is it not that unscientific conduct which, as if contributing to knowledge, asserts the untenable and untruthful? Sometimes the conceit is so unwarranted as to appear on its very face a vagary, extravagant and impossible.

Science thinking is reverend and reserved—for here dash is impudence, nor is cheek courage. The habitual theorist finds a fascination in sheer novelty—of such the cautious thinker is chary. But if the giddy and reckless are proscribed the use of edge tools, the sober-minded is allowed the tentative hypothesis. The one would cut the knot, the other would untie it. The honest theorist is simply feeling his way. He may have *a priori* methods despite of Mr. Gradgrind's much mouthing for "facts!" Such modest ventures, "assumptions," may prove real forecasts of wide significance. But such is not romancing. Nature has her seers, who have happily uttered esoteric truth which has afterwards crystallized into accepted theory in the formulation given it by the setting of the factors denominated "facts." So it was with Germany's great poet. But here comes a nice distinction between the condemnable and the commendable, between romancing in science and the scientific imagination. Goethe's guesses were neither blunders nor vagaries. His theory of the genesis of the flower, of the vertebrate origin of the skull, and his forecast of the doctrine of descent, were all marvelous births, but legitimately begotten, the offspring of pure scientific imagination. As in advance of the thought then in vogue, they seemed prematurely brought into the light, and for a time were nurslings of unpromising vitality.

---

[1] From a forthcoming work by Dr. Lockwood.

But a truth thus evolved finds no similitude in the spark struck out by flint and steel. Nor is such truth premature, as to its ratiocination, as would appear could we but time its gestation. I think it is always the outcome of "unconscious cerebration." The mind of the seer has been deeply thinking on generic lines. As first expressed such a truth may be ore-like—rich, but crude—and it may have to wait for the facts which shall serve as faggots for the crucible.

Having in the article "Coati-Mondi and its Cousins," with perhaps seeming insufficient warrant, asserted for Nasua a quadrumanous kinship, now that the faggots have been got in plenty, why not smelt the ore? Or, dropping metaphors, let us go in direct quest of Nasua's ancestry, even its biogenesis, upon reasoning lines.

In tracing the pedigree of some regal line, perhaps we should reach a very ancient Norman stirp. But however ancient, it would be the Norman of civilization, not his savage progenitor of the Palæolithic age. This would be as far up the stream of the past as we could sail. So with our Nasua, we must stop at the origin of the Educabilia, the quasi intelligent animals, those namely which have the cerebrum or frontal brain relatively large and roofing, or overlapping the cerebellum or small hinder brain.

1. First then, as to that quadrumanous alliance of Coati; on what line of reasoning may the genealogy be traced? My first impression of this fact came to me as a conviction of the imagination. I did not then, it is so long ago, know anything of the modern doctrine of "unconscious cerebration." I had so studied the living animal as to fairly know its ways, and I came to suspect, as an inheritance, the monkey strain, as the breeders would

say. I could see the traits but could not demonstrate them. At best I could but quote the great poet:

> "Such seething brains,
> Such shaping fantasies, that apprehend
> More than cool reason ever comprehends."

2. That which backed up the imagination was the psychological or mental manifestation. Here were data for comparison, in such well-marked lines ran the parallels of expression of the Nasuan and the monkey mind. The hints afforded in the complex use made of the hands and the tail—the many unmistakable monkey didos, or antics, which came not of training nor of aping, but of real generic aptitudes. These all pointed to a physical correspondence, and looked directly to ancestral inheritance.

3. I think it was in 1873, the year after the appearance of my article, that an interesting anatomical discovery was announced by the great academician, the successor of Cuvier, Henri Milne-Edwards. He had dissected a Nasua and had discovered in the limb bones of this animal structural alliances to the lemurs, or lowest monkeys. Here was, indeed, a pleasant and important confirmatory fact.

4. But to round up the proof, one more class of evidence is needed, the testimony of palæontology. In behalf of the extinct animals will the fossils bear witness in this matter? The writer was instructor in the natural sciences in the grammar school or preparatory department of Rutgers College, when he received from its author a pamphlet "On the principal types of the orders of Mammalia Educabilia," by Professor E. D. Cope; read before the American Philosophical Society, April 18, 1873. My eyes caught a foot-note to one of the pages, thus: "Dr. Lockwood, of Rutgers College, in a recent number of the *Popular Science Monthly*, expressed serious suspicions of the quadrumanous relationships of the Coati, little thinking at the time that the specimens to confirm his view were at that moment in the hands of palæontologists."

Let us now take down this testimony from nature's own mouth. Certain fossil bones had been found in the Eocene formation of Wyoming. Previous to the Eocene period of time the fauna of this world's life-history had consisted of animals of a very low grade on the mammalian lines. Technically they are classed as the Ineducabilia. In the Eocene days the creative force was exercised on higher lines of life. Then were produced the real ancestors of those animals which are included in the zoölogical term Educabilia, whose cerebral physiology has been already explained. As notable genera of those days I may mention the pseudo-bear—Notharctus of Leidy, and the cut-tooth beast—Tomitherium of Cope. Others there were by Marsh, but their descriptions are not in my reach. Leidy's species, *Notharctus tenebrosus*, described from very limited material, was a little animal about two-thirds the size of a raccoon. Cope's species, *Tomitherium rostratum*, founded on a much larger amount of material, was an animal probably about the size of *Cebus capuçinus*, the prehensile-tailed monkey so common in shows. Upon technical considerations both these animals, albeit their strange and high-sounding scientific names, were low-grade monkeys. They were quadrumanous animals but of a synthetic, that is, comprehensive type. The femur of Tomitherium was so long as to indicate that the knee was entirely free from the body, as it is in the whole monkey tribe of to-day, but never in any of the carnivores. The round head of the radius indicates a complete power of supination of the fore feet; that is, the ability to lift the hand, so to speak, forward and to turn the palm upward, a faculty of limb peculiar to monkeys and man, while the distal or lower end of the same bone resembles closely that of Semnopithecus, a high-grade old-world monkey. " We have then," continues Cope, whom we are epitomizing, " an animal with a long thigh free from the body, a foot capable of complete pronation and supination, and a form of lower jaw and teeth quite similar to that of the lower monkeys."

And in this connection what about our Coati ? Says the professor : " A comparison with Nasua reveals no distant affinity. The fore limb presented in Tomitherium a great similarity to that of Nasua." And in both genera are some striking similarities in the cutting teeth. " The first impression derived from the appearance of the lower jaw, and the dentition, and from the humerus, is that Tomitherium is an ally of Coati, the humerus being almost a *facsimile*." And is it not a striking coincidence that Professor Leidy's first impression of Notharctus was of a resemblance to Procyon, the raccoon, which, as we have shown, is generic with Nasua.

It is evident then that Tomitherium and Nasua show some alliances in structure which look to a common origin or biogenesis, but it is a descent on different lines. From his study of an immense amount of fossil relics from the same geological formation which yielded Tomitherium, Professor Cope has erected the order Taxeopoda, which includes these fossil lemurine forms. This order occupies the earliest section of the line of the Primates. First in these fossil forms come the Lemuroids at the base of the Primate lineage. After these extinct forms appear the true Lemuroidea, that is, the present or living Lemurs, followed by the monkey proper, and these by the anthropoid apes. Now, among the lemurine forms, and fairly started on the quadrumanal line of descent from the typical lemurine order Taxeopoda, occurs Phenacodus, after which Tomitherium appears somewhat farther advanced on this Primate line.

Now, on an off-line or branch from the lemurine Taxeopoda, starts the flesh-eating line ; first the Creodonta, the "slaughter-teeth," then the Carnivora proper, with the present living forms. Cercoleptes connects Nasua to the extinct Creodonta, and through these back to the lemurine order Taxeopoda, their ancestral stock.

So we have at last found the Nasuan lineage and ancestry in the Eocene times. Phenacodus was an animal of a synthetic structure, a comprehensive type, from which flowed several ordinal streams of life. In such a composite form, or structural make-up, can we not surmise the creative possibilities and purposes of the Divine Mind ?

It is an interesting fact that in a direct line one of Nasua's ancestors still exists in the same forests of South America. The kinkajou, *Cercoleptes caudivolvulus*, reduced to one species. When tamed it is an interesting little animal with amiable ways and monkey traits. The tail is prehensile in that it curls around an object, which with plantigrade feet give it in Germany the name curling-bear. Like the monkeys it will hold its food in one hand and break it and feed it to the mouth with the other. So then, kinkajou and Coati-Mondi come honestly by their monkey tricks, having a clear title by heritage.

Without turning homilist let me close by citing Ruskin and one of the great ancients : "The greatest thing a human soul ever does in this world is to see something." The Hebrew bard both sang and prayed : "Open thou mine eyes, that I may behold glorious things out of thy law !" And this biogenesis of Coati-Mondi, is it not one of the wonderful things—an outcome of Divine law ?